HIGH PERFORMANCE
COMPUTING
MODERNIZATION OFFICE

OFFICE OF THE DIRECTOR OF
DEFENSE RESEARCH AND ENGINEERING
1010 NORTH GLEBE ROAD, SUITE 510
ARLINGTON, VA 22201

December 13, 2002

MEMORANDUM FOR: SEE DISTRIBUTION

SUBJECT: Call for Additional FY 2003 Common High Performance Computing Software Support Initiative (CHSSI) Project Proposals in Chemical/Biological Defense

The Department of Defense (DoD) High Performance Computing Modernization Program (HPCMP) seeks additional CHSSI projects in FY 2003 to develop scalable high-performance software for the DoD in the area of Chemical/Biological Defense (CBD). These new projects should augment or supplement ongoing efforts within the CBD portfolio.

There are currently three funded projects within the CBD portfolio. The first project will produce a scalable lidar simulation tool that interfaces with a high fidelity plume model. The second project will establish a scalable software capability for the detection and identification of chemical agents from long-wavelength infrared (LWIR) hyperspectral data. The third project in the portfolio will develop scalable software that can quickly and accurately predict the atmospheric fate and transport of chemical agents. We are soliciting new proposals to expand the focus of the portfolio in the following areas:

CBD Sensor Prototyping
Proposals are sought which will support and enhance the design of efficient, accurate, and rapid virtual prototyping of chemical/biological agent (CBA) sensors. Of particular interest are software projects that can be used to construct and test a new sensor in a virtual environment as well as evaluate sensor design concepts.

Multi-CBD-Sensor Integration
We seek software proposals that provide a modeling and simulation capability to integrate all available sensor data and decision aids to determine the appropriate protective actions. Data formats from sensor integration models should conform to the Joint Effects Model (JEM). JEM is targeted to be the DoD Nuclear, Biological, and Chemical (NBC) hazard prediction model.

Biological Agent Identification, Detection, and Amelioration
Projects are encouraged which enable the detection, identification, and amelioration of biological agents. Proposals that will provide improved, scalable models of the detoxification and decontamination of biological agents are encouraged.

All government scientists and engineers in DoD S&T and T&E laboratories, centers, facilities, and agencies may prepare CHSSI project proposals. The proposal's project leader must be a government DoD employee although parts of the proposed project may be contracted to industry, academia, or other government laboratories as appropriate. Annual funding for CHSSI projects ranges from $200,000 to $600,000 and projects typically last three years. Proposal project leaders should contact the CBD Portfolio Leader, Dr. Steven Bunte <bunte@arl.army.mil>, not this office, for additional technical and funding information.

The attached package details the submission, evaluation and selection processes, as well as proposal instructions. A copy of this memorandum with attachment is available on the HPCMP's WWW page. Please note that the due date for proposals to the HPCMP is **1400 EDT March 18, 2003**.

My point of contact for this process is Dr. Leslie S. Perkins, Project Manager for Software Applications Support. She may be reached at 703-812-8205 or by email at chssi-team@hpcmo.hpc.mil.

/Signed/
Cray J. Henry
Director
High Performance Computing
Modernization Program

Attachment:
FY 2003 CHSSI CBD Project Selection Plan

cc:
High Performance Computing Advisory Panel Members
Computational Technology Area Advisory Panel Members

DISTRIBUTION:
Director, Operational Test and Evaluation
Director, Defense Advanced Research Projects Agency
Commander, Defense Logistics Agency
Director, Defense Threat Reduction Agency
Director, Missile Defense Agency
Director, Armed Forces Radiobiology Research Institute
Director, Joint National Integration Center
Director, U.S. Army Aviation and Missile Command
Commander, U.S. Army Medical Research and Materiel Command
Commander, U.S. Army Soldier and Biological Chemical Command
Commander, Space and Missile Defense Command
Commander, U.S. Army White Sands Missile Range
Commander, U.S. Army Dugway Proving Ground
Commander, U.S. Army Tank-Automotive & Armaments Command
Commander, U.S. Army Engineer Research and Development Center
Commander, U.S. Army Soldiers System Center
Commander, U.S. Army White Sands Test Center
Director, U.S. Army Redstone Technical Test Center
Director, Topographic Engineering Center
Director, U.S. Army Research Laboratory
Director, U.S. Army Cold Regions Research and Engineering Laboratory
Director, Coastal and Hydraulics Laboratory
Director, Construction Engineering Research Laboratory
Director, Environmental Laboratory
Director, Geotechnical and Structures Laboratory
Director, Information Technology Laboratory
Chief of Naval Research, Office of Naval Research
Commander, Naval Research Laboratory
Commander, Naval Surface Warfare Center, Dahlgren Division
Commander, Naval Surface Warfare Center, Indian Head Division
Commander, Naval Surface Warfare Center, Panama City Division
Commander, Naval Air Warfare Center, Weapons Division
Commander, Naval Air Warfare Center, Aircraft Division
Director, Space and Naval Warfare Systems Center, San Diego
Commander, Naval Surface Warfare Center
Commander, Naval Undersea Warfare Center
Commander, Arnold Engineering Development Center
Commander, Air Force Air Armament Center
Commander, Air Force Flight Test Center
Commander, Electronic Systems Center
Commander, Space and Missile Systems Center
Commander, Air Force Weather Agency Center
Commander, Air Force Aeronautical Systems Center
Corporate Information Officer, Air Force Research Laboratory/Corporate Information Office
Director, Developmental Planning Directorate

Director, Air Force Research Laboratory/Air Force Office of Scientific Research
Director, Air Force Research Laboratory/Directed Energy Directorate
Director, Air Force Research Laboratory/Human Effectiveness Directorate
Director, Air Force Research Laboratory/Information Directorate
Director, Air Force Research Laboratory/Materials and Manufacturing Directorate
Director, Air Force Research Laboratory/Munitions Directorate
Director, Air Force Research Laboratory/Propulsion Directorate
Director, Air Force Research Laboratory/Sensors Directorate
Director, Air Force Research Laboratory/Air Vehicles Directorate
Director, Air Force Research Laboratory/Space Vehicles Directorate
Commandant, Air Force Institute of Technology
Commander, Defense Information Systems Agency - Joint Interoperability Test

Common High Performance Computing Software Support Initiative (CHSSI)
Chemical/Biological Defense (CBD) Portfolio
Project Selection Plan

1. Proposal Due Date and Time: Proposal submissions must be received electronically as attachments to Dr. Leslie Perkins at chssi-team@hpcmo.hpc.mil no later than **1400 EDT March 18, 2003**.

2. Proposal Medium: The proposal must be submitted as an electronic document attachment, either as an MS Word 97 (or later) file or as an Adobe Acrobat Portable Document Format (*.pdf) file. Security settings must allow for printing and for text and image copying. Embed images only if necessary to convey the scheme of the development effort. Unnecessary high-density images detract from the content of the proposal and significantly increase file size.

3. Proposal Format: Proposals not in the proper format will not be reviewed. The proposal will consist of a title page, the proposal text, and attached resumes. All pages must use 1 inch margins, single-spaced lines, and 12-point Times New Roman font. The title page must contain the information in the sequence described at 3a, below. Proposal text is limited to fifteen (15) pages and must adhere **strictly** to the proposal format (sequence and content) detailed at 3b. The attached resumes (see "Project Team," below) may not exceed five (5) pages.

a. Title Page: The title page may contain no proposal text. The title page (one page) is limited to the five subheadings described below.

Title Page Mandatory Headers	Description
Project Title	Short descriptive title; 2 lines maximum
Government Project Leader	Name, organization, position, mailing address, voice phone number, fax number, E-mail address
Project Team Members	Name, organization, and role of each project team member. Note that a resume for each member must be attached to the proposal.
Portfolio Area To Which Proposal Applies	Identify only **one** (1) area from those described in the "*Call for Additional FY 2003 Common High Performance Computing Software Support Initiative (CHSSI) Project Proposals in Chemical/Biological Defense*."

Title Page Mandatory Headers	Description
Abbreviated Funding Table	List the requested funding for code development and for project management per year. (Include funding for required documentation, testing, and reporting under "Project Management".)

Funding Category	FY 2003	FY 2004	FY 2005	Total
Code Development				
Project Management				
Total CHSSI Funding	=sum(b2:b3)	=sum(c2:c3)	=sum(d2:d3)	=sum(e2:e3)

b. Proposal Text: This section is limited to **fifteen** (15) pages (total) exclusive of resume attachment. Mandatory contents and sequence are shown below:

Proposal Text Mandatory Headers	Description
Executive Summary	The executive summary **may not exceed** one page. The summary must include the five subheadings, below.
Title	Title of the project
Technical Goals	State the broad technical goals of the project.
Technical and Computational Challenges	Describe technical and computational challenges expected in the software parallelization.
DoD Impact	Specify DoD impact of the project's goals.
Abstract	Provide a high level abstract of the proposal.
Goals and Objectives	Concisely describe the goals and objectives of the proposed project.

Proposal Text Mandatory Headers	Description
Portfolio Match	This section addresses the first evaluation criterion: "Fit of the Proposed Project within the CBD Portfolio." In this section explain how the project fits the area described in the call for proposals and included on the title page and how the project addresses a specific need stated in the call. Explain the value of the software proposal to the portfolio. This is an important requirement. Proposals that do not fit within a solicited area will be **disqualified**.
Technical Merit	This section is composed of five subsections that, in aggregate, address the second evaluation criterion: "Technical Merit of the Proposed Project." Proposed projects must focus on developing scalable portable versions of existing critical DoD application software or relevant infrastructure software. In the **subsections** (Background and Value, Applicability, and Restrictions, etc.) which follow, provide the necessary information for the evaluation teams to appraise your proposal's merit against the following questions: - Will the proposal result in significant technical advancement? - What is the value of the software proposal to the applicable portfolio? - Are the technical approach and level of innovation appropriate?
Background and Value	Present a concise **background** of the subject area and legacy software addressed by the proposal. Then explain why scalable versions of this capability are **needed and/or valuable** to critical DoD CBD problems and how the proposed project **enhances** the DoD CBD capability to model/analyze such critical problems. Compare this proposed effort to the **state-of-the-art/ state-of-the-practice**.
Applicability and Restrictions	Describe the DoD community who will **use** the resulting parallel software. Describe your initial plans to accomplish **technology transfer**. Describe any factors that may **limit** use of the product. In this section also, discuss the **intellectual property rights** and security **classification/export control issues** associated with the development of the proposed software. Typically, CHSSI software binary and source code is widely disseminated in the DoD. If this is not planned for this project, please explain. Ensure you satisfactorily answer the question: Will the resulting code be useful to a wide technical community?

<table>
<tr><th>Proposal Text Mandatory Headers</th><th>Description</th></tr>
<tr><td>Technical Approach and Leveraging</td><td>
Discuss any links to, leveraging of, or collaboration with other scalable software projects sponsored by other DoD or government agencies, industry, or academic institutions.

Then discuss the technical approach and method(s) to be used in parallelizing the proposed software project and the scalability to be attained. Explain how these will differ from or complement the linked/leveraged projects. Describe the proposed plan to achieve software scalability, portability, and reusability for DoD high performance computing platforms. Discuss plans to ensure compatible performance with existing and planned scalable application software. Explain the risks associated with the proposed approaches as well as steps to mitigate them.

Discuss the results of a performance profiling scan of the current software. The results should highlight what software profiling application was used, the platform(s) used for the profiles, and identify the areas of the application with associated performance data.

If the existing code has been parallelized, provide a table detailing the performance of the code as a function of the number of processors on ported architectures. Please provide sufficient background information regarding the test case used for these performance numbers and the units of the performance measure.
<table>
<tr><th>Number of Processors</th><th>Architecture 1</th><th>Architecture 2</th></tr>
<tr><td>1</td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td></tr>
</table>

Ensure this section satisfactorily answers the questions:

Are the technical approach and level of innovation appropriate?
Will the proposal result in significant technical advancement?
Where is/are the bottleneck(s) in the application?
Will parallelization remove or lessen the(se) bottleneck(s)?
Is the potential speed-up in performance commensurate with requested funds?

</td></tr>
</table>

<table>
<tr><th>Proposal Text Mandatory Headers</th><th>Description</th></tr>
<tr><td>Metrics</td><td>Describe the history of the algorithms to be used and, briefly, describe the verification and calibration that the application software has undergone. Enumerate and explain the benchmarks and known numerical and/or experimental data for validating and evaluating the proposed scalable application software, and how these will be adapted and employed for this project.</td></tr>
<tr><td>Deliverables</td><td>List the specific software products that will be completed at the conclusion of this project. Briefly describe the commitment of the project participants to maintain the software beyond the duration of this project.

Identify two or more DoD HPCMP scalable architectures that will be used to develop scalable implementations of the proposed software. In addition, identify the DoD scalable high performance computing platforms to be used for demonstration and production computations.</td></tr>
<tr><td>Funding Requirements Table</td><td>The evaluators will appraise this section to determine the answers to these questions:
- Does the proposal leverage non-CHSSI sources of funding or other ongoing activities?
- Is the funding level appropriate to the team composition, schedule and work to be accomplished in creating the deliverables?
- Have sufficient resources been outlined to meet the documentation, reporting, and testing requirements?
- Are these funding levels or activities identified by Service/Agency?
- What is the level of Service/Agency or multi-Service/Agency commitment to support completed projects?

The financial resources needed to execute the proposed project are presented in this section, as is the planned distribution of funds between/among project participants. See the sample table below.

<table>
<tr><th>CHSSI Funding Category</th><th>FY 2003</th><th>FY 2004</th><th>FY 2005</th><th>Total</th></tr>
<tr><td>Participant A Code Development</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Participant B Code Development</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Total Code Development</td><td>=sum(b2:b3)</td><td>=sum(c2:c3)</td><td>=sum(d2:d3)</td><td>=sum(e2:e3)</td></tr>
<tr><td>Total Project Management</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Total CHSSI Funding</td><td>=sum(b4:b5)</td><td>=sum(c4:c5)</td><td>=sum(d4:d5)</td><td>=sum(e4:e5)</td></tr>
</table>

Proposers should note that there are considerable software testing, documentation writing, and status reporting requirements imposed on CHSSI. (See paragraph 6.) CHSSI project management requirements</td></tr>
</table>

<table>
<tr><th>Proposal Text Mandatory Headers</th><th>Description</th></tr>
<tr><td></td><td>include software development plans, revision control, alpha- and beta-testing, monthly financial reporting, quarterly progress reporting, and annual reviews. Travel may also be required to brief CHSSI management or portfolio leaders or to meet with team members. Proposals should budget for these requirements and they should be shown as a separate line (under Total Project Management) on this table.

Also identify the "matching" funding from other government agencies, academia, or industry that will be leveraged. See the sample table below.
<table>
<tr><th>Other Leverage</th><th>FY 2003</th><th>FY 2004</th><th>FY 2005</th><th>Total</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Total "Matching" Funds</td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Project Team</td><td>Describe the makeup of the integrated project team and identify contributions of each participant. Specify the fraction of project effort for each participant and the participant's role in the project. Please note that we encourage inter-service teaming.

Describe the members' experience working similar joint projects and/or plans to develop and maintain communication and cooperation.

Ensure the following questions are satisfactorily answered in your narrative:
- Do the team members have credentials that would engender success for the project?
- Do the team members have a history of successful development efforts?
What has been the team members' past performance with CHSSI projects, if applicable?

What experience have they had working with one another or what methods will be used to maintain cooperative working relationships?</td></tr>
</table>

c. Resume Attachment: Attached resumes are limited to a **total** of five (5) pages. The resumes are not counted toward the maximum 15-page limit that applies to the text portion of the proposal.

Mandatory Attachment	Description
Resumes	As an attachment (of not more than five pages) to the proposal, provide short resumes of the **key participants** in the development effort. List full name, organization, position, **role in the development effort**, telephone number, and E-mail address, and include brief descriptions of germane qualifications (highlighting experience in high performance computing and/or computational science). No one resume should exceed one page. The aggregate number of pages for all resumes may not exceed five pages. Evaluators will use this information to key in on the following questions: - Do team members have **credentials** that would engender success for the project? - Do team members have a history of **successful development** efforts? - What has been the team members' **past performance with CHSSI projects**, if applicable?

4. Evaluation: Proposals will be received and catalogued by the CHSSI team at the High Performance Computing Modernization Program Office (HPCMO) who will send the proposals, to the CBD portfolio leader for technical evaluation and to the High Performance Computing Advisory Panel members for evaluation of DoD mission relevance. The CBD portfolio leader will chair a project proposal evaluation panel, which will evaluate the proposals using the criteria shown below. Panel members may not be members of the proposal teams. The panel will evaluate proposals using a 100-point total scoring scheme against the criteria shown below. The technical evaluations will be combined with the DoD mission relevance scores. The CBD Portfolio Leader will submit the resultant list of portfolio proposals to the Project Manager for Software Applications Support.

Maximum Points	Criteria
Not Applicable	**Fit of the Proposed Project within the Portfolio Topic** - Does the project fit the area cited in the CBD portfolio? - Does the project address a specific need of the portfolio focus area? *"Fit of the Proposed Project" is a **Go/No Go** criterion.* *The proposed project must be responsive to the call for proposals.*
70	**Technical Merit of the Proposed Project** - Will the proposal result in significant technical advancement? - What is the value of the software proposal to the applicable portfolio? - Are the technical approach and level of innovation appropriate? - Will the resulting code be useful to a wide technical community?
15	**Financial Planning, Resourcing, and Project Management** - Does the proposal leverage non-CHSSI sources of funding or other ongoing activities? Are these funding levels or activities identified by Service/Agency? - What is the level of Service/Agency or multi-Service/Agency commitment to support completed projects? - Is the funding level appropriate to the project complexity, team composition, and schedule? - Have sufficient resources been outlined to meet the documentation, reporting, and testing requirements?
15	**Project Team** - Do the team members have credentials that would engender success for the project? - Do the team members have a history of successful development efforts? - What has been the team members' past performance with CHSSI projects, if applicable? - What experience have they had working with one another or what methods will be used to maintain cooperative/collegial working relationships?

5. <u>Selection:</u> The Project Manager for Software Applications Support will present the resultant ratings and recommendations to the Director, HPCMP. The Director will forward his recommendations, consistent with available funding, to the Deputy Under Secretary of Defense (Science and Technology). After a decision by the Deputy Under Secretary of Defense (Science and Technology), an announcement of additional FY 2003 CBD project awards will be made to the DoD user community. We have tentatively scheduled the announcement for May 15, 2003.

6. **Post-Selection Requirements:** There are significant requirements for documentation, testing, reporting, and financial management that the portfolio leader and each selected project's principal investigator/ project leader must complete during the course of the project's development and fielding. Some of those key requirements are outlined below. **Compliance with CHSSI project management, reporting, and documentation requirements is essential for continued funding of selected projects.**

Category	Item
Management Endorsement	A **memorandum of endorsement** from your laboratory or test center director will be the **first post-selection requirement - due within 30 days of selection**. The purpose of the memorandum is to convey the director's knowledge of and **support** for the endeavor, noting that the work may divert some of the time the project leader would normally work in direct support of the organization's mission. This memorandum also acknowledges the **responsibility** of the project leader's organization for support of the software product(s) after CHSSI development effort is completed. A sample memorandum is at the last page of these instructions. **Do not submit a proposal if you do not expect to receive the endorsement from your management.** Projects failing to obtain and submit the required management endorsement will not be funded and will be removed from selection.
Documentation	**Formal Export Control Certification and Statement of Intellectual Property Rights** Within three (3) months after selection, project leaders will submit a formal document that provides an official statement concerning the project's export control determination and issues of intellectual property rights.
	Software Development Plan Project leaders will develop their project's software development plan and subsequently refer to it, follow it, review, recommend changes, and report on compliance with the plan. The document is a detailed plan for developing the software and includes schedules, project plans, commitments, and resources. It describes the process for designing, implementing, documenting, and testing the final software product, and addresses these specific questions: - What is to be produced for delivery? - What tasks must be accomplished and when must these tasks be started and completed? - What is the order in which these tasks must be accomplished and what are the task dependencies? - What are the criteria for acceptance of the final product? - Who will perform the tasks that are required to produce the deliverables and how, specifically, will these tasks be performed?

Category	Item
Testing	Portfolio and project leads are required to write test plans for three developmental test phases, provide test documentation, and to successfully conduct and submit reports concerning the results of those tests. The Joint Interoperability Test Command (JITC), an independent test agent, may conduct an Operational Test Readiness Review (OTRR) of the projects.
Monthly Financial Reports	Portfolio leaders furnish monthly financial reports to the HPCMP. Project leaders must submit information to the portfolio leaders regarding obligations and expenditures for the current and previous fiscal years. More detailed financial reports are to be provided upon request from the HPCMP.
Quarterly Progress Reports	Project leaders provide feeder information to portfolio leaders for quarterly status reports to the HPCMP. These reports follow a required format and the project leader therein details development progress, difficulties or delays encountered or anticipated, and resultant proposed changes in cost or schedule.
Other Data Calls	Portfolio and project leads must also respond in an accurate and timely manner to *ad hoc* data calls and reports requested by or on behalf of the Project Manager for Software Applications Support.

7. Additional Information: Please refer to the HPCMP World Wide Web page at http://www.hpcmo.hpc.mil/ for additional information about CHSSI. There is a proposal template in Microsoft Word that you may download from that site. The template corresponds to the format for this call for proposals. Frequently asked questions about this call for proposals will also be posted to that web site.

SAMPLE MEMORANDUM OF ENDORSEMENT

Use the appropriate Service/Agency letterhead and memorandum format.

TO: Project Manager for Software Applications Support
DoD High Performance Computing Modernization Office
1010 North Glebe Road, Suite 510
Arlington, VA 22201-4795

SUBJECT: Memorandum of Endorsement

The <Name of Parent Organization> fully supports the development efforts of the proposed Common High Performance Computing Software Support Initiative (CHSSI) project <Title of Project>, headed by <Principal Investigator's (PI's) Name>. It is understood that <PI's Name> will devote a portion of his/her normal duty time in support of this effort.

<Organization Name> currently funds this software development project as part of <PI's Name> <Internal Project Name> at $/year. This effort is funded through FY 20##.

Upon the completion of CHSSI funding for this project, <Organization Name> will maintain and provide support for the developed software products for the DoD.

Signature and signature block of
Division Chief, Laboratory Director, or
Test Center Director